REMARKS

Claims 1-22 and 45-48 are currently pending in the application, of which claims 1, 9, 16, 45, and 46 are independent. Claims 1, 2, 9, 16, 45, 46, and 48 have been amended to better claim the invention. Applicants respectfully urge that the pending claims are in condition for allowance.

Applicants thank the Examiner for withdrawing the 35 U.S.C. §101 and §112 rejections of the claims (Office Action at pages 2-3).

In the Office Action:

claims 1-22 and 45-48 were rejected under 35 U.S.C. § 102(a) as being anticipated by Sauro et al., "Next Generation Simulation Tools: The Systems Biology Workbench and BioSPICE Integration," Journal of Integrative Biology, vol. 7, No. 4, 2003, p. 353-370 (hereafter "Sauro");

claims 1-5, 8-11, 14-17, 20-22, 45 and 48 were rejected under 35 U.S.C. § 102(b) as being anticipated by Hucka et al., "The Erato Systems Biology Workbench: Enabling Interaction and Exchange Between Software Tools for Computational Biology," Pacific Symposium on Biocomputing, vol. 7, 2002, p. 450-461 (hereafter "Hucka");

claims 1-22 and 45-48 were provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-19, 26 and 64 of co-pending Application No. 10/783,628; and

claims 1-22 and 45-48 were provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-19, 32 and 38-39 of co-pending Application No. 10/783,552.

Applicants respectfully traverse the rejections for the reasons below.

35 U.S.C. § 102 Rejections

Rejections under Sauro

Claims 1-22 and 45-48 were rejected under 35 U.S.C. § 102(a) as being anticipated by Sauro. Applicants respectfully traverse the rejection.

Applicants respectfully urge that Sauro fails to disclose or suggest at least the following feature of claim 1: *executing the composite graphical model to generate as output dynamic behavior of the biological system using a first type of computational model for the first chemical reaction, and a second type of computational model for the second chemical reaction, and the specified constraint, the executing involving evaluating the at least two different types of mathematical models*.

The system of claim 1 is capable of modeling and executing <u>composite models</u> of a biological system. The composite model *has components described by at least two different types of mathematical models*. Composite models comprising components described by multiple types of mathematical models allow a user to model "complex real-world" systems (Specification at page 28). As noted in the Specification, a composite model may be used to describe, for example, "both metabolic and regulatory systems in the same model."

The Examiner cites the "modules" and "classes" of Sauro as examples of "different reaction modules" (Office Action at page 5). However, none of the cited passages address *executing a composite graphical model of a biological system*. Sauro describes Systems Biology Workbench (SBW) which is a message-passing resource-sharing <u>framework</u> that connects different applications or "modules" (Sauro at page 355, "Materials and Methods" and page 356, Figure 1, showing the SBW Broker passing messages between three different modules). At the beginning of the passage cited by the Examiner, Sauro indicates that the passage describes "the internal structures and design of SBW," or the internal program code of Sauro's software framework (Sauro at page 360, last paragraph).

SBW does not create models or execute models at all, and the modules of Sauro do not represent reaction equations in a model. Nothing in the cited passage of Sauro describes *executing a composite graphical model*.

Sauro discusses one simulation tool that may be connected as a module to the SBW framework and used to analyze a model, the Jarnac tool (Sauro at page 364). Sauro states that Jarnac is capable of simulating "<u>either</u> continuous (ordinary differential equation based) <u>or</u>

probabilistic (based on Gillespie method) models" (Sauro at page 364, third paragraph). These are examples of <u>non-composite models</u>. Claim 1 includes *executing a <u>composite</u> graphical model.*

The Examiner also cites "JDesigner," described in Sauro at page 364 (Office Action at page 6). However, this passage also does not disclose *executing the composite graphical model.* As noted in Sauro, JDesigner "has no simulation capabilities" (Sauro at page 364, last paragraph). Accordingly, JDesigner does not execute <u>any</u> model.

Claim 9 includes *executing, using the computing device, the composite graphical model to generate dynamic behavior of the modeled biological system using a first type of computational model for the first chemical reaction, a second type of computational model for the second chemical reaction and the specified constraint, the executing involving evaluating the at least two different types of mathematical models.*

Claim 16 includes *executing the constructed composite graphical model of the biological system to generate dynamic behavior of the modeled biological system using a first type of computational model for the first chemical reaction, a second type of computational model for the second chemical reaction, and the specified constraint, the executing involving evaluating the at least two different types of mathematical models.*

Claim 45 includes *executing the composite graphical model to generate dynamic behavior of the modeled biological system using a first type of computational model for the first chemical reaction, a second type of computational model for the second chemical reaction, and the specified constraint, the executing involving evaluating the at least two different types of mathematical models.*

Claim 46 includes *constructing a composite graphical model of the biological system comprising components described by at least two different types of mathematical models and executing one of the first chemical reaction and the second chemical reaction identified by a first reaction, the first chemical reaction being executed using a first type of computational model concurrently with the second chemical reaction being executed using a second type of computational model.*

Sauro does not disclose or suggest the above features of claims 9, 16, 45, and 46 for the reasons set forth above in regard to claim 1.

Claims 2-8 depend from and incorporate all of the features of claim 1. Thus, claims 2-8 are patentable for at least the same reasons as set forth above for claim 1. Claims 10-15 and 48 depend from and incorporate all of the features of claim 9. Thus, claims 10-15 and 48 are patentable for at least the reasons set forth above for claim 9. Claims 17-22 depend from and incorporate all of the features of claim 16. Thus, claims 17-22 are patentable for at least the reasons set forth above for claim 16. Claim 47 depends from and incorporates all of the features of claim 46. Thus, claim 47 is patentable for at least the reasons set forth above for claim 46.

Accordingly, Applicants respectfully urge the Examiner to reconsider and to withdraw the above 35 U.S.C. § 102(a) rejection of claims 1-22 and 45-48.

Rejections under Hucka

Claims 1-5, 8-11, 14-17, 20-22, 45 and 48 were rejected under 35 U.S.C. § 102(b) as being anticipated by Hucka. Applicants respectfully traverse the rejection.

Applicants respectfully urge that Hucka fails to disclose or suggest at least the following feature of claim 1: *executing the composite graphical model to generate as output dynamic behavior of the biological system using a first type of computational model for the first chemical reaction, and a second type of computational model for the second chemical reaction, and the specified constraint, the executing involving evaluating the at least two different types of mathematical models.*

The system of claim 1 is capable of modeling and executing <u>composite models</u> of a biological system. The composite model *comprises components described by at least two different types of mathematical models.*

Like Sauro, Hucka describes the SBW framework. The Examiner cites Hucka's description of Jarnac and JDesigner at pages 9-10 of the Office Action. However, as noted above , Jarnac describes the simulation of only <u>non-composite</u> models, and JDesigner has no simulation capabilities.

11

The Examiner further states, at page 9 of the Office Action, that "within one module using JDesigner and Jarnac to run a simulation, the user can create the type of desired module, which can be comprised of different classes each class modeling a different chemical reaction as is inherent in the Java programming capabilities."

Applicants respectfully urge that the Examiner misconstrues SBW's "modules." As discussed above, SBW's modules are software components that allow for the sharing of biological models between different applications (Hucka at Abstract). The modules do not represent "different chemical reactions" as suggested by the Examiner, but rather are part of the internal structures of the SBW software. Hucka does not discuss a *composite model of a biological system*, nor *executing the composite model*, which are included in claim 1.

Claim 9 includes *executing, using the computing device, the composite graphical model to generate dynamic behavior of the modeled biological system using a first type of computational model for the first chemical reaction, a second type of computational model for the second chemical reaction and the specified constraint, the executing involving evaluating the at least two different types of mathematical models.*

Claim 16 includes *executing the constructed composite graphical model of the biological system to generate dynamic behavior of the modeled biological system using a first type of computational model for the first chemical reaction, a second type of computational model for the second chemical reaction, and the specified constraint, the executing involving evaluating the at least two different types of mathematical models.*

Claim 45 includes *executing the composite graphical model to generate dynamic behavior of the modeled biological system using a first type of computational model for the first chemical reaction, a second type of computational model for the second chemical reaction, and the specified constraint, the executing involving evaluating the at least two different types of mathematical models.*

Claims 2-5 and 8 depend from and incorporate all of the features of claim 1. Thus, claims 2-5 and 8 are patentable for at least the same reasons as set forth above for claim 1. Claims 10-11, 14-15, and 48 depend from and incorporate all of the features of claim 9. Thus, claims 10-11, 14-15, and 48 are patentable for at least the reasons set forth above for claim 9.

Claims 17 and 20-22 depend from and incorporate all of the features of claim 16. Thus, claims 17 and 20-22 are patentable for at least the reasons set forth above for claim 16.

Accordingly, Applicants respectfully urge the Examiner to reconsider and to withdraw the above 35 U.S.C. § 102(a) rejection of claims 1-5, 8-11, 14-17, 20-22, 45 and 48.

Double Patenting Rejections

In the Office Action, the Examiner has provisionally rejected claims 1-22 and 45-48 on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-19, 26 and 64 of co-pending United States Patent Application Number 10/783,628 (Attorney Docket No. MWS-108). Since the rejection is provisional, Applicants will submit a terminal disclaimer, if necessary, when the pending claims are deemed allowable.

In the Office Action, the Examiner has further provisionally rejected claims 1-22 and 45-48 on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-19, 32 and 38-39 of co-pending United States Patent Application Number 10/783,552 (Attorney Docket No. MWS-109). Since the rejection is provisional, Applicants will submit a terminal disclaimer, if necessary, when the pending claims are deemed allowable.

CONCLUSION

In view of the above, Applicants urge that the pending application is in condition for allowance. Should the Examiner feel that a teleconference would expedite the prosecution of this application, the Examiner is urged to contact the Applicants' attorney at (617) 227-7400.

Please charge any shortage or credit any overpayment of fees to our Deposit Account No. 12-0080, under Order No. MWS-110RCE2. In the event that a petition for an extension of time is required to be submitted herewith, and the requisite petition does not accompany this response, the undersigned hereby petitions under 37 C.F.R. §1.136(a) for an extension of time for as many months as are required to render this submission timely. Any fee due is authorized to be charged to the aforementioned Deposit Account.

Dated: June 8, 2009   Respectfully submitted,

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